

Appl. No. 10/641,355

Reply to Office action of August 10, 2004

REMARKS

Reconsideration of this application is requested. The claims presented for reconsideration are claims 1-18, and 20.

Claim 1 has been amended according to the description in the specification at page 5, lines number as 17-18. Claims 19 and 21 have been canceled in response to the restriction requirement, with applicants reserving the right to further pursue the subject matter of those claims by way of a divisional application. Claims 22 and 23 are newly added, and are to a preferred embodiment according to the description in the specification at page 6 at lines numbered 5-11. Accordingly, no new matter is presented by way of this amendment.

I. Rejection of Claims 1, 5, 6, 9 13, and 17 Under 35 USC § 102(b)

Claims 1, 5, 6, 9 13, and 17 have been rejected under 35 USC § 102(b) as being anticipated by U.S. Patent No. 4,238,631 (Daviduk). In addition, the same claims have been rejected under the same ground as being anticipated by U.S. Patent No. 4,071,573 (Owen). These rejections are traversed, and reconsideration of the claims is requested.

Daviduk discloses a method of converting methanol to dimethyl ether and ultimately to higher boiling point hydrocarbons. The method incorporates the use of a ZSM-5 zeolite catalyst to convert the methanol, and the conversion reaction is carried out in a dense fluidized bed reactor.

Owen is similar to Daviduk in that Owen discloses a method of converting methanol to product using a zeolite, with the conversion reaction also being carried out in a fluidized bed reactor. However, the Owen process converts the methanol to relatively high boiling products in the gasoline range using an up flow type of fluidized bed reactor.

Applicants' invention is directed to a method for converting an oxygenate feedstock to an olefin product. At least a portion of the exposed catalyst is stripped with a stripping gas, and at least a portion of the stripped catalyst is returned to the reaction zone without regenerating. The invention differs from both Daviduk and Owen in that the feedstock is exposed to a silicoaluminophosphate molecular sieve catalyst. At least one result of such as difference is that

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a product high in light olefin content, particularly ethylene and propylene, is produced. No such product is produced by either Daviduk or Owen. Since neither Daviduk nor Owen disclose each and every element set forth in any of the claims of this application, the claims are not anticipated by either reference. Removal of the rejection of claims under 35 USC § 102(b) is, therefore, requested.

II. Rejection of Claims Under 35 USC § 103(a)

A. Rejection of Claims 3, 4, 7, 8, 10-12, 18 and 20

Claims 3, 4, 7, 8, 10-12, 18 and 20 have been rejected under 35 USC § 103(a) as being unpatentable over Daviduk, as well as over Owen. These rejections are traversed.

It has been pointed out in the office action that neither Daviduk nor Owen disclose various aspects of applicants' claimed invention such as ratio of exposing time and stripping time of catalyst, stripping gas flow rate, percentage of hydrocarbon removed from the catalyst during stripping, an polymerization of the olefin product. Nevertheless, it has been concluded that each of these claimed limitations is but an obvious modification of what is disclosed in either reference. The stated reason for this conclusion of obviousness is that it would have obvious to modify either reference, because each "these parameters depend[s] on the activity of the catalyst and how much the catalyst is covered by impurities." Office action of 8/10/2004, pages 4 and 5.

Although it may be generally true that various of the claimed parameters involve either directly or indirectly such things as catalyst activity and amount of coke on the catalyst, which directly affects catalyst activity, none of that is taught by the cited references. In fact, such a teaching comes from applicants' own specification. Thus, there is nothing in the prior art to suggest that the differences between what applicants have claimed as their invention and what is disclosed in the prior art are obvious differences. This is particularly clear when a closer look at the prior art is taken. For example, both Daviduk and Owen are directed to processes for making gasoline quality product. Both references use a ZSM catalyst to maximize the conversion of alcohol feed to an aromatic type product. Daviduk indicates at column 3, lines 13-27, that the conversion of the alcohol to aromatics is actually a two-step process in which the alcohol is first converted to dimethyl ether and water, and the dimethyl ether is then further converted to the

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aromatic. If a significant portion of the methanol is not quickly converted to dimethyl ether, there can be undesirable side reactions with the unconverted methanol and aromatic products. The ZSM catalyst is said to be particularly good at quickly converting methanol to dimethyl ether then to aromatics, and the catalyst is stripped following contact with the feed to remove the aromatic product and keep the catalyst cool. See Daviduk, column 9, line 55, to column 10, line 5.

Applicants' invention is to a method of making olefin product, which is considerably different from the gasoline type product produced by either Daviduk or Owen. The olefin product is produced by contacting an oxygenate feedstock, for example methanol, ethanol, dimethyl ether, etc., with a silicoaluminophosphate (SAPO) molecular sieve. When at least a portion of the catalyst that has contacted the feed is stripped and returned to the reactor for re-use without regeneration, the life of the catalyst can be substantially enhanced and the selectivity to form light olefin can be increased. Neither the use of a SAPO molecular sieve nor the manufacture of a light olefin product is disclosed or suggested by either Daviduk or Owen.

B. Rejection of Claims 14-16

Claims 14-16 have been rejected under 35 USC § 103(a) as being unpatentable over Daviduk in view of U.S. Patent No. 6,245,703 (Kuechler), as well as over Owen in view of Kuechler. These rejections are also traversed.

Kuechler discloses a process for making light olefin from an oxygenate, with SAPO molecular sieve catalyst being one of the preferred catalysts. The Kuechler process is particularly directed toward keeping the regenerator vessel at a lower operating temperature by injecting water directly into the regenerator to keep it cooler.

Kuechler has very little in common with either Daviduk or Owen. Both Daviduk and Owen are to methods of making gasoline type products, while Kuechler is to a method of making a light olefin. These are vastly different products involving a substantial difference in chemistries. To infer that one of ordinary skill in the art would have found it obvious to switch the catalyst of Daviduk or Owen with the preferred SAPO catalyst used by Kuechler is not logical, since the goal of Kuechler is to produce a completely different product. To make such a

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switch would, in essence, destroy the ability to produce the gasoline type product that is sought to be manufactured by Daviduk and Owen. Thus, combining the SAPO type of catalyst that is suggested by Kuechler with either the Daviduk or Owen process would destroy the ability of both Daviduk and Owen to make their desired product. Moreover, Kuechler makes no suggestion of stripping a catalyst that has been contacted with oxygenate feed and returning the stripped catalyst to the reactor. Rather, Kuechler is primarily concerned with cooling the regenerator, and this does not appear to be a problem in the Daviduk or Owen process. Therefore, the combination of Daviduk or Owen with Kuechler cannot suggest a process for producing olefin products such as that claimed by applicants.

III. Double Patenting

The claims have also been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 6,613,950. In response to this rejection, applicants submit herewith a terminal disclaimer.

IV. Conclusion

Having demonstrated that the cited references, taken either alone or in combination, fail to disclose or suggest the invention as claimed, this application is in condition for allowance. Accordingly, applicants request early and favorable reconsideration in the form of a Notice of Allowance.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated, since this should expedite the prosecution of the application for all concerned.

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If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1712 (Docket #: 2000B028/2).

Respectfully submitted,

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Date

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